DOMAIN STRUCTURE OF THE MAJOR ALLERGEN OVOMUCOID BY SOLUTION NMR

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The interest in the ovomucoid protein is twofold. First it is a protein of interest for medical studies due to its potent allergen activity. Second, as a special variety of glycosylated protein (Kazal family), it allows us to explore the role of protein glycosylation in protein-membrane interactions for a particular, model case. The nature, location, and orientation of the glycosyl groups are determining factors in protein-membrane interactions and therefore are critical to biological processes involving glycosylated proteins. We have found that as opposed to other glycosylated proteins, ovomucoid does not induce ionic currents across lipid membranes. This behavior likely has a structural cause, yet very little overall structural data is available. In this study, we use solution NMR spectroscopy to determine the structure of the chicken ovomucoid protein, taking advantage of the division of its structure into three stable domains of 55-65 amino acids each. We present results on the protein purification steps and isolation of separate domains suitable for solution NMR spectroscopy. We then present NMR results acquired on a 500 MHz spectrometer, and we show atomic models of individual domains and of overall protein structure from analysis of NMR spectra.